

# **ENVIRONMENTAL CONDITIONS**

## **NOISE**

**Folsom Lake State Recreation Area**

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**by**

**LSA Associates, Inc.**

**20 Executive Park, Suite 200**

**Irvine, CA 92614**

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# **NOISE**

## **Introduction**

LSA Associates has prepared this summary to document the current noise environment at the Folsom Lake State Recreation Area (the Unit). The purpose of this summary is to:

- Discuss the fundamentals of noise
- Characterize the current noise environment
- Provide background information for dealing with issues related to traffic noise, and boat noise
- Identify the noise regulations in affected local jurisdictions in the vicinity of the Unit

Literature reviewed included published scientific articles, files, and previous studies pertaining to the Unit. Fieldwork consisted of ambient noise level testing at several locations throughout the Unit. The primary sources for the background research were planning documents from the municipalities in which the Unit resides, including El Dorado, Placer and Sacramento Counties, the City of Folsom, and the community of Granite Bay. Although the Unit is a part of the California State Park system and owned by the Bureau of Reclamation, it is subject to the noise ordinances of these municipalities. A list of source documents is included in the reference subsection.

## **Fundamentals of Noise**

Sound is a pressure wave transmitted through the air. It is described in terms of loudness or amplitude (measured in decibels), frequency or pitch (measured in Hertz [Hz] or cycles per second), and duration (measured in minutes or hours). The standard unit of measurement of the intensity of sound is the decibel (dB), with 0 dB corresponding roughly to the threshold of hearing.

Typical human hearing can detect changes in sound levels of approximately three dB under normal conditions. However, the human ear is not equally sensitive to all frequencies. Sound waves below 16 Hz are not heard at all and are felt more as a vibration. Similarly, while people with extremely sensitive hearing can hear sounds as high as 20,000 Hz, most people cannot hear above 15,000 Hz. In all cases, hearing acuity falls off rapidly above approximately 10,000 Hz and below approximately 200 Hz. Since the human ear is not equally sensitive to sound at all frequencies, a special frequency dependent rating scale is used to relate noise to human sensitivity. The A-weighted decibel scale, dBA, performs this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear.

Noise is defined as unwanted sound and is known to have several adverse effects on people, including hearing loss, speech and sleep interference, physiological responses, and

annoyance. Based on these known adverse effects of noise, the federal government, the State of California, and many local governments have established criteria to protect public health and safety and to prevent disruption of certain activities.

Various noise measurements are used to assess the level and the annoyance potential of community noise such as that generated by aircraft activity and arterial traffic. They include:

- C      A-Weighted Sound Level, dBA
- C      Continuous Equivalent (Average) Noise Level,  $L_{eq}$
- c      Community Noise Equivalent Level, CNEL, or Day-Night Sound Level,  $L_{dn}$

These measures are used in assessing noise and are discussed in this analysis. The standards that are considered important include the Noise Elements of the General Plan of the Cities of Folsom and Granite Bay and the Counties of Sacramento, El Dorado, and Placer, as well as the Municipal Code Noise Ordinance of these Cities and Counties. The measures are summarized as follows:

- C      *A-Weighted Sound Level.* The A-weighted sound pressure level, commonly called dBA. The dB refers to a measurement in decibels. The A identifies a particular setting of the measurement instrument, the sound level meter. It provides a scale that is consistent with the range and characteristics of peoples' hearing ability. It is measured over a period of time, typically one hour, to identify the minimum and maximum levels and the statistical variation of fluctuating sounds.
- C      *Continuous Equivalent (Average) Noise Level ( $L_{eq}$ ).* An energy equivalent level of the fluctuating noise for the time period being measured. Such data are applied to the 24 hour measurement of noise, CNEL or  $L_{dn}$  (see below).
- C      *Community Noise Equivalent Level (CNEL) or Day-Night Sound Level ( $L_{dn}$ ).* A given level of noise may be more or less tolerable depending on the duration of exposure experienced by an individual. The U.S. Department of Housing and Urban Development (HUD) and the Environmental Protection Agency (EPA) have adopted the  $L_{dn}$  as their standard. This measure weights the average noise level ( $L_{eq}$ ) for late evening and early morning hours (10:00 p.m. to 7:00 a.m.), increasing them by 10 dBA. The daytime noise levels are then combined with these weighted levels and are averaged to obtain a 24-hour average noise level. In the State of California, CNEL is widely used, which also weights events occurring between the evening hours of 7 p.m. and 10 p.m., increasing them by 5 dBA.

Noise levels that are less than 40 dB CNEL/ $L_{dn}$  are not considered significant. This finding is identified as part of the noise assessment guidelines for environmental impact statements (National Academy of Science 1977). In addition, generally established regulatory standards throughout California do not typically address noise levels that are less than 40 dBA. However, even low levels of noise can be annoying to people when the background ambient noise is very low.

## **Regulatory Setting**

A project would normally have a significant effect on the environment if it: conflicts with the adopted environmental plans and goals of the community in which it is located, substantially increases the ambient noise levels for adjoining areas, or exposes people to severe noise levels. The following discusses the noise standards of affected counties and cities.

### **Sacramento County**

#### **Sacramento County General Plan Noise Element.**

The Noise Element of the Sacramento County General Plan, originally adopted December 15, 1993, and last amended June 24, 1998, contains policies designed to accomplish the following goals: 1) to protect the citizens of the County from the harmful and annoying effects of excessive noise exposure, and 2) to protect the economic base of the County by preventing incompatible land uses from encroaching upon existing or planned noise producing uses. The Noise Element provides the following relevant policies:

- NO-1** Noise created by new transportation noise sources should be mitigated so as not to exceed 60 dBA  $L_{dn}/CNEL$  at the outdoor activity areas of any affected residential lands or land use situated in the unincorporated areas. When a practical application of the best available noise reduction technology cannot achieve the 60 dBA  $L_{dn}/CNEL$  standard, then an exterior level of 65 dBA  $L_{dn}/CNEL$  may be allowed in outdoor activity areas. (The Noise Element defines "transportation noise sources" as traffic on public roadways and railroad line operations.)
- NO-2** Noise created by new non-transportation noise sources shall be mitigated so as not to exceed any of the noise level standards of Table II-1, as measured immediately within the property line of any affected residential land use situated in the unincorporated areas. (Table II-1 of the Noise Element provides daytime (7 a.m. to 10 p.m.) exterior noise standards of 50 dBA  $L_{50}$  and 70 dBA  $L_{max}$  and nighttime (10 p.m. to 7 a.m.) standards of 45 dBA  $L_{50}$  and 65  $L_{max}$ .)
- NO-3** Where proposed non-transportation noise sources are likely to produce noise levels exceeding the performance standards of Table II-1 at existing or planned residential uses, an acoustical analysis shall be required as part of the environmental review process so that noise mitigation may be included in the project design.
- NO-6** The compatibility of proposed residential projects with existing and future noise levels due to transportation noise sources shall be evaluated through a comparison to Figure II-1, Land Use Compatibility for Community Noise Environments (in which parks, water recreation, and riding stables are acceptable in areas up to 75 dBA  $L_{dn}/CNEL$ , conditionally acceptable in areas between 75 and 80 dBA  $L_{dn}/CNEL$ , and unacceptable in areas above 80 dBA  $L_{dn}/CNEL$ ) to Table II-3, "Acceptable Noise Levels in Unoccupied Rooms," and to Figure II-4 for projects affected by aircraft noise.

## Sacramento County Noise Ordinance

Chapter 6.68 (Noise Control) of the Sacramento County Code (SCC) contains noise standards designed to assess noise complaints. Specifically, SCC §6.68.070 provides exterior noise standards of 55 dBA from 7 a.m. to 10 p.m. and 50 dBA from 10 p.m. to 7 a.m. for all residential land uses. Noise levels are not allowed to exceed 20 dBA above the exterior noise level standard at any time, 15 dBA above the standard for a cumulative period of 1 minute per hour, 10 dBA above the standard for a cumulative period of 5 minutes per hour, 5 dBA above the standard for 15 minutes per hour, and the standard for a cumulative period of 30 minutes per hour.

## **El Dorado County**

### El Dorado County Public Health and Safety Plan

The El Dorado County General Plan Public Health and Safety Element (December 1993), includes noise as one of the issues. The goal of the noise sub-element is to ensure that County residents are not subjected to noise beyond acceptable levels.

One of the objectives of the noise sub-element is to protect existing noise sensitive development (e.g., hospitals, schools, churches, and residential) from new uses that would generate noise levels incompatible with those uses and, conversely, discourage noise sensitive uses from locating near sources of high noise levels. In its Noise Element, El Dorado County lists maximum allowable noise exposure for transportation noise sources (see Table N-1). The Noise Element also lists the noise performance standards for noise sensitive land uses (i.e., residences, schools, hospitals) affected by non-transportation sources (see Table N-2). Applicable policies for noise regulation of the Unit include:

Policy 6.5.1.2: Where proposed nonresidential land uses are likely to produce noise levels exceeding the performance standards of Table N-2 at existing or planned noise sensitive uses, an acoustical analysis shall be required as part of the environmental review process so that noise mitigation may be included in the project design.

Policy 6.5.1.3: Where noise mitigation measures are required to achieve the standards of Tables A and B, the emphasis of such measures shall be placed upon site planning and project design. The use of noise barriers shall be considered a means of achieving the noise standards only after all other practical design related noise mitigation measures have been integrated into the project and the noise barriers are not incompatible with surroundings.

Policy 6.5.1.7: Noise created by new proposed non-transportation noise sources shall be mitigated so as not to exceed the noise level standards of Table N-2 for noise sensitive uses.

Policy 6.5.1.8: New development of noise sensitive land uses will not be permitted in areas exposed to existing or projected levels of noise from transportation noise sources, which exceed the levels specified in Table A, unless the project design includes effective mitigation measures to reduce exterior noise and noise levels in interior spaces to the levels specified in Table N-1.

Policy 6.5.1.10: To provide a comprehensive approach to noise control, the County shall:

- A. Develop and employ procedures to ensure that noise mitigation measures required pursuant to an acoustical analysis are implemented in the project review process and, as may be determined necessary, through the building permit process.
- B. Develop and employ procedures to monitor compliance with the standards of the Noise Element after completion of projects where noise mitigation measures were required.
- C. The zoning ordinance shall be amended to provide that noise standards will be applied to ministerial projects with the exception of single family residential building permits.

<b>TABLE N-1 MAXIMUM ALLOWABLE NOISE EXPOSURE FOR TRANSPORTATION NOISE SOURCES</b>			
<b>LAND USE</b>	<b>OUTDOOR ACTIVITY AREAS<sup>1</sup></b>	<b>INTERIOR SPACES</b>	
	<b>L<sub>dn</sub>/CNEL, dBA</b>	<b>L<sub>dn</sub>/CNE L</b>	<b>L<sub>eq</sub>, dBA<sup>2</sup></b>
Residential	60 <sup>3</sup>	45	--
Transient Lodging	60 <sup>3</sup>	45	--
Hospitals, Nursing Homes	60 <sup>3</sup>	45	--
Theaters, Auditoriums, Music Halls	--	--	35
Churches, Meeting Halls, Schools	60 <sup>3</sup>	--	40
Office Buildings	--	--	45
Libraries, Museums	--	--	45
Playgrounds, Neighborhood Parks	70	--	--
<sup>1</sup> In Communities and Rural Centers, where the location of outdoor activity areas is not clearly defined, the exterior noise level standard shall be applied to the property line of the receiving land use. For residential uses with front yards facing the identical noise source, an exterior noise level criterion of 65 dB L <sub>dn</sub> /CNEL shall be applied at the building facade, in addition to a 60 dB L <sub>dn</sub> /CNEL criterion at the outdoor activity area. In rural regions, an exterior noise level criterion of 60 dB L <sub>dn</sub> /CNEL shall be applied at a 100 foot radius from the residence.			
<sup>2</sup> As determined for a typical worst-case hour during periods of use.			
<sup>3</sup> Where it is not possible to reduce noise in outdoor activity areas to 60 dB L <sub>dn</sub> /CNEL or less using a practical application of the best available noise reduction measures, an exterior noise level of up to 65 dB L <sub>dn</sub> /CNEL may be allowed provided that available exterior noise level reduction measures have been implemented and interior noise levels are in compliance with this table.			

Source: El Dorado County General Plan 1993

**TABLE N-2  
NOISE LEVEL PERFORMANCE PROTECTION STANDARDS FOR NOISE  
SENSITIVE LAND USES AFFECTED BY NON-TRANSPORTATION<sup>1</sup> SOURCES**

NOISE LEVEL	DAYTIME 7 AM-7 PM		EVENING 7 PM-10 PM		NIGHT 10 PM-7 AM	
	COMMUNITY	RURAL	COMMUNITY	RURAL	COMMUNITY	RURAL
Hourly $L_{eq}$ , dB	55	50	50	45	45	40
Maximum level, dB	70	60	60	55	55	50

Each of the above noise levels shall be lowered by 5 dB for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises. These noise level standards do not apply to residential units established in conjunction with industrial or commercial uses (e.g., caretaker dwellings).

The County can impose noise level standards, which are up to 5 dB less than those specified above, based upon determination of existing low ambient noise levels in the vicinity of the project site.

In Community Areas, the exterior noise level standard shall be applied to the property line of the receiving property. In Rural Areas, the exterior noise level standard shall be applied at a point 100 feet away from the residence. The above standards shall be measured only on property containing a noise sensitive land use. This measurement standard may be amended to provide for measurement at the boundary of a recorded noise easement between all effected property owners and approved by the County.

<sup>1</sup> For the purposes of the Noise Element, transportation noise sources are defined as traffic on public roadways, railroad line operations, and aircraft in flight. Control of noise from these sources is preempted by federal and State regulations. Control of noise from facilities of regulated public facilities is preempted by California Public Utilities Commission (CPUC) regulations. All other noise sources are subject to local regulations. Nontransportation noise sources may include industrial operations, outdoor recreation facilities, HVAC units, schools, hospitals, commercial land uses, other outdoor land use, etc.

Source: El Dorado County General Plan 1993

## **Placer County**

### Placer County General Plan Noise Element

Placer County has adopted a Noise Element as part of its General Plan (1994). Goal 9.A of the Noise Element states “To protect County residents from the harmful and annoying effects of exposure to excessive noise.” Applicable policies for noise regulation of the Unit include:

- Policy 9.A.1: The County shall not allow development of new noise sensitive uses where the noise level due to nontransportation noise sources will exceed the noise level standards of Table N-3 as measured immediately within the property line of the new development, unless effective noise mitigation measures have been incorporated into the development design to achieve the standard specified in Table N-3.
- Policy 9.A.2: The County shall require that noise created by new nontransportation noise sources be mitigated so as not to exceed the noise standards of Table N-3 as measured immediately within the property line of lands designated for noise sensitive uses.
- Policy 9.A.3: The County shall continue to enforce the State Noise Insulation Standards (California Code of Regulations, Title 24) and Chapter 35 of the Uniform Building Code (UBC).
- Policy 9.A.5: Where proposed nonresidential land uses are likely to produce noise levels exceeding the performance standards of Table N-3 at existing or planned noise sensitive uses, the County shall require submission of an acoustical analysis as part of the environmental review process so that noise mitigation may be included in the project design.
- Policy 9.A.6: The feasibility of proposed projects with respect to existing and future transportation noise levels shall be evaluated by comparison to Table N-3.
- Policy 9.A.8: New development of noise sensitive land uses shall not be permitted in areas exposed to existing or projected levels of noise from transportation noise sources, including airports, which exceed the levels specified in Table N-4, unless the project design includes effective mitigation measures to reduce noise in outdoor activity areas and interior spaces to the levels specified in Table N-4.
- Policy 9.A.9: Noise created by new transportation noise sources, including roadway improvement projects, shall be mitigated so as not to exceed the levels specified in Table N-4 at outdoor activity areas or interior spaces of existing noise sensitive land uses.

**TABLE N-3**  
**ALLOWABLE NOISE LEVELS WITHIN SPECIFIED ZONE DISTRICTS**  
**Applicable to New Projects by or Including**  
**Non-transportation Noise Sources**

<b>Zone District of Receptor</b>	<b>Property Line of Receiving Use</b>	<b>Interior Spaces</b>
Residential Adjacent to Industrial	60	45
Other Residential	50	45
Office/Professional	70	45
Transient Lodging	65	45
Neighborhood Commercial	70	45
General Commercial	70	45
Heavy Commercial	75	45
Limited Industrial	75	45
Highway Services	75	45
Shopping Center	70	45
Industrial	--	45
Industrial Park	75	45
Industrial Reserve	--	--
Airport	--	45
Unclassified	--	--
Farm	(see footnote) <sup>1</sup>	--
Agriculture Exclusive	(see footnote)	--
Forestry	--	--
Timberland Preserve	--	--
Recreation and Forestry	70	--
Open Space	--	--
Mineral Reserve	--	--

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<sup>1</sup> Normally, agricultural uses are noise insensitive and will be treated this way. However, conflicts with agricultural noise emissions can occur where single family residences exist within agricultural zone districts. Therefore, where effects of agricultural noise upon residences located in these agricultural zones are a concern, an L<sub>dn</sub> of 70 dBA will be considered acceptable outdoor exposure at a residence.

Notes:

- Except where noted otherwise, noise exposures will be those which occur at the property line of the receiving use.
- Where existing transportation noise levels exceed the standards of this table, the allowable  $L_{dn}$  shall be raised to the same level as that of the ambient level.
- If the noise source generated by, or affecting the uses shown above consists primarily of speech or music, or if the noise source is impulsive in nature, the noise standards shown above shall be decreased by 5 dB.
- Where a use permit has established noise level standards for an existing use, those standards shall supersede the levels specified in this table. Similarly, where an existing use, which is not subject to a use permit causes noise in excess of allowable levels, said excess noise shall be considered the allowable level. If a new development is proposed which will be affected by noise from such an existing use, it will ordinarily be assumed that the noise levels already existing or those levels allowed by the existing use permit, whichever are greater, are those levels actually produced by the existing use.
- Existing industry located in industrial zones will be given the benefit of the doubt in being allowed to emit increased noise consistent with the state of the art at the time of expansion. In no case will expansion of an existing industrial operation be cause to decrease allowable noise emission limits. Increased emissions above those normally allowable should be limited to a one-time 5 dB increase at the discretion of the decision making body.
- The noise level standards applicable to land uses containing incidental residential uses, such as caretaker dwellings at industrial facilities and homes on agriculturally zoned land, shall be the standards applicable to the zone district, not those applicable to residential uses.
- Where no noise level standards have been provided for a specific zone district, it is assumed that the interior and/or exterior spaces of these uses are effectively insensitive to noise.

Source: Placer County General Plan 1994

<b>TABLE N-4</b> <b>MAXIMUM ALLOWABLE NOISE EXPOSURE</b> <b>TRANSPORTATION NOISE SOURCES</b>			
LAND USE	OUTDOOR ACTIVITY AREAS <sup>1</sup>	INTERIOR SPACES	
	L <sub>dn</sub> /CNEL, dB	L <sub>dn</sub> /CNEL, dB	L <sub>eq</sub> , dB <sup>2</sup>
Residential	60 <sup>3</sup>	45	--
Transient Lodging	60 <sup>3</sup>	45	--
Hospitals, Nursing Homes	60 <sup>3</sup>	45	--
Theaters, Auditoriums, Music Halls	--	--	35
Churches, Meeting Halls	60 <sup>3</sup>	--	40
Office Buildings	--	--	45
Schools, Libraries, Museums	--	--	45
Playgrounds, Neighborhood Parks	70	--	--
<sup>1</sup> In Communities and Rural Centers, where the location of outdoor activity areas is not clearly defined, the exterior noise level standard shall be applied to the property line of the receiving land use. <sup>2</sup> As determined for a typical worst-case hour during periods of use. <sup>3</sup> Where it is not possible to reduce noise in outdoor activity areas to 60 dB L <sub>dn</sub> /CNEL or less using a practical application of the best available noise reduction measures, an exterior noise level of up to 65 dB L <sub>dn</sub> /CNEL may be allowed provided that available exterior noise level reduction measures have been implemented and interior noise levels are in compliance with this table.			

Source: Placer County General Plan 1994

## City of Folsom

### Folsom General Plan Noise Element

The Noise Element of the Folsom General Plan (Folsom Community Development Department, 1988) was developed to mitigate noise conflicts and to minimize future noise conflicts adopting policies and implementation measures designed to achieve land use compatibility for proposed development. The contents of the Noise Element were determined by the requirements of Section 65302(f) of the California Government Code and by the "Guidelines for the Preparation and Content of Noise Elements of the General Plan," which were adopted and published by the California Office of Noise Control (ONC) in 1976. For the purpose of the General Plan, noise sensitive land uses include residential land uses, schools, hospitals, and nursing homes.

The Noise Element of the Folsom General Plan contains several policies that are considered relevant to the Unit:

Policy 30.2: Develop and implement effective strategies to abate and avoid excess noise exposures in the City by requiring that effective noise mitigation measures be incorporated into the design of new noise generating and new noise sensitive land uses.

Policy 30.3: Protect areas within the City where the present noise environment is within acceptable limits.

Policy 30.4: Areas within the City of Folsom shall be designed as noise impacted if exposed to existing or projected exterior noise levels exceeding 60 dBA  $L_{dn}/CNEL$ , or the performance standards relate to nontransportation related noise sources. (These standards are summarized in Table N-5 below.) Each noise level standards shall be reduced by 5 dBA for simple tone noises, noises consisting primarily of speech or music, or recurring impulsive noises. Noise from single occurrences, such as the passage of locomotives, heavy trucks, or aircraft, should also be evaluated in terms of single event noise levels. The maximum noise created by such an event may result in activity interference, even though the cumulative noise exposure in terms of  $L_{dn}/CNEL$  is within acceptable limits. The potential for sleep disturbance is usually of primary concern in such cases and should be evaluated on a case-by-case basis.

Policy 30.5: New development of residential or other noise sensitive land uses will not be permitted in noise impacted areas unless effective measures are incorporated into the project design to reduce these noise levels as follows:

1. For noise attributable to traffic on public roadways, railroad line operations, and aircraft: 60 dBA  $L_{dn}/CNEL$  or less is acceptable in outdoor activity areas, and 45 dBA  $L_{dn}/CNEL$  or less is acceptable at the interior level. Where it is not possible to reduce exterior noise, because of these sources, to 60 dBA  $L_{dn}/CNEL$  or less by incorporating a practical application of the best available noise reduction technology, an exterior noise level of up to 65 dBA

$L_{dn}$ /CNEL will be allowed. Under no circumstances will interior noise levels be permitted to exceed 45 dBA  $L_{dn}$ /CNEL with windows and doors closed.

2. For nontransportation related noise sources: achieve compliance with the performance standards contained within Table N-5.

If compliance with the adopted standards and policies of the Noise Element will not be achieved, a statement of overriding considerations for the project must be provided.

<b>TABLE N-5</b> <b>CITY OF FOLSOM NOISE LEVEL PERFORMANCE STANDARDS FOR</b> <b>NEW PROJECTS AND DEVELOPMENTS</b>		
Exterior Noise Level Standards, dBA		
Cumulative Number of Minutes in any One Hour Time Period	Daytime 7:00 a.m. to 10:00 p.m.	Nighttime 10 p.m. to 7:00 a.m.
30	50	45
15	55	50
5	60	55
1	65	60
0	70	65

Source: City of Folsom General Plan 1988.

Policy 30.6: When industrial, commercial land uses or other uses including nontransportation related noise sources are proposed, which would affect areas containing noise sensitive land uses, noise levels generated by the proposed use shall not exceed the performance standards contained within Table N-6.

Policy 30.7: Prior to approval of proposed development of residential or other noise sensitive land uses in a noise impacted area, an Acoustical Analysis may be required. The acoustical analysis shall:

1. Be the responsibility of the applicant.
2. Be prepared by a qualified person experienced in the field of environmental noise assessment and architectural acoustics.

3. Include representative noise level measurements with sufficient sampling periods and locations to adequately describe local conditions.
4. Include estimated noise levels in terms of  $L_{dn}$ /CNEL and/or the standards of Table E for existing and projected future (20 years hence) conditions, with a comparison made to the adopted policies of the Noise Element.
5. Include recommendations for appropriate mitigation to achieve compliance with the adopted policies and standards of the Noise Element. Where the noise source in question consists of intermittent single events, the report must address the effects of maximum noise levels in sleeping rooms in terms of possible sleep disturbance.
6. Include estimates of noise exposure after the prescribed mitigation measures have been implemented

- Policy 30.8: The City of Folsom shall endeavor to develop and employ procedures to ensure that the requirement imposed pursuant to the findings of an acoustical analysis are implemented as part of the project review and building permit processes. The appropriate time to require an acoustical analysis would be as early in the project review process as possible so that noise mitigation may be an integral part of the project design.
- Policy 30.9: Noise level criteria applied to land uses other than residential or other noise sensitive uses shall be consistent with the standards in the land use compatibility for community noise environments established in Guidelines for the Preparation and Content of Noise Elements of the General Plan (California Department of Health, 1976).
- Policy 30.10: The City of Folsom shall enforce the State Noise Insulation Standards (California Code of Regulations, Title 24) and Chapter 35 of the Uniform Building Code (UBC). Title 24 requires that an acoustical analysis be prepared for all new developments of multifamily dwellings, condominiums, hotels, and motels proposed for areas within 60 dBA  $L_{dn}$ /CNEL contour of a major noise source for the purpose of documenting that an acceptable interior noise level of 45 dBA  $L_{dn}$ /CNEL or below will be achieved.
- Policy 30.11: The City of Folsom shall adopt a community noise control ordinance to address noise complaints and to provide local industry with performance standards for future developments and equipment modifications. The ordinance should be consistent with the model noise control ordinance contained in the database of the General Plan.
- Policy 30.15: If noise barriers are required to achieve the noise level standards contained within the Noise Element, the following construction practices are recommended:

1. Noise barriers exceeding six feet in height relative to the roadway should incorporate an earth berm so that the total height of the solid portion of the barrier (such as masonry or concrete) does not exceed six feet.
2. The total height of a noise barrier above roadway elevation should normally be limited to 12 feet.
3. The noise barriers should be designed so that their appearance is consistent with other noise barriers in the project vicinity.

The General Plan provides noise standards for new projects and developments. Noise created by a nontransportation related noise sources shall be controlled so as not to exceed the noise level standards set forth in Table N-5 as measured at any affected residentially designated lands.

### **Granite Bay Community**

The Placer County Board of Supervisors established the Granite Bay Municipal Advisory Council (MAC) in 1980. The primary purpose of the MAC is to advise the Board of Supervisors regarding issues affecting the Community. The Granite Bay Community follows the noise standards established in the Placer County Noise Element.

Ambient Noise Degradation. In addition to the standards stated above, the significance of noise impacts may be described by the expected change in ambient noise levels that would occur as a result of a project.

Expected reactions to changes in ambient noise levels for persons who are exposed to noise have been reported, quantified by metrics that define short-term exposure (e.g., hourly  $L_{eq}$ ,  $L_{max}$ , and  $L_n$ ). These metrics are usually used to describe noise impacts due to industrial operations, machinery, and other sources that are not associated with transportation. According to Egan and others, as shown in Table N-6, an increase of at least 3 dBA is usually required before the change will be clearly noticeable. This analysis assumes that a minimally perceptible increase of 3 dBA represents a significant increase in ambient noise levels.

<b>TABLE N-6</b> <b>SUBJECTIVE REACTION TO CHANGES IN</b> <b>NOISE LEVELS OF SIMILAR SOURCES</b>		
<b>Change in Level, dBA</b>	<b>Subjective Reaction</b>	<b>Factor Change in Acoustical Energy</b>
1	Imperceptible (Except Tones)	1.3
3	Barely Perceptible	2.0
6	Clearly Perceptible	4.0
10	About Twice (or Half) as Loud	10.0

Source: Egan 1988

## **Existing Noise Measurement Results**

Ambient noise monitoring was conducted by LSA staff in the Unit vicinity between 9:00 a.m. and 6:00 p.m. on September 19, 2002, to document the existing noise environment. A total of ten locations around Folsom Lake were selected for the ambient noise monitoring. Ambient noise measurements were taken for 20 minutes at each site. Table N-7 lists the noise monitoring results at these ten locations. The measured noise data show that noise in the Unit is generally low to moderate, typical of rural areas. The average noise level measured ranged from 37.2 dBA  $L_{eq}$  to 65.3 dBA  $L_{eq}$ . Locations that are near roads with higher traffic volumes show higher noise levels than locations away from the traffic.

<b>Table N-7: Ambient Noise Levels, dBA</b>				
<b>Site</b>	<b><math>L_{eq}</math></b>	<b><math>L_{max}</math></b>	<b><math>L_{min}</math></b>	<b>Noise Sources</b>
1. Nimbus Dam Overlook; hillside above Lake Natoma	51.2	55.7	31.9	Traffic on Hazel Avenue and Highway 50; autos entering and existing overlook@ lot; birds
2. Willow Creek State Park; approximately 50 feet from edge of water	42.9	54.2	37.9	Traffic on Folsom Boulevard; autos within the park; pedestrian traffic; birds
3. Approximately 80 feet east of Riley Street and Rainbow Bridge; south side of American River	54.6	62.4	44.9	Traffic on Riley Street and Rainbow Bridge; birds
4. Top of levee near Dam Road and Natoma Street intersection	52.7	65.7	39.1	Traffic along Dam Road and Riley Street; boats on the lake; airplane overflight; birds
5. Lake Hills Drive at Shoreline Pointe Road; a residential area with view of lake	65.3	85.8	32.5	Lawn mower; autos; birds; one cement truck drove up and turned around that contributed the loud noise
6. Salmon Falls parking lot	38.6	55.0	31.5	Autos on Salmon Falls Road; construction equipment on hillside above parking lot; birds
7. Peninsula Campground; boat launch area	44.4	59.8	32.7	Boats on the lake; waves hitting shoreline; birds
8. Rattlesnake Bar recreation area	42.5	55.9	32.5	Boats on the lake; birds
9. Granite Beach	37.2	57.3	31.8	Boats on the lake; pedestrians; birds
10. Douglas Boulevard at Auburn Folsom Road	60.1	70.9	52.2	Traffic on Douglas Boulevard and Auburn Folsom Road

Source: LSA Associates, Inc., September 2002.

## **Recommendations**

In consideration of high use periods or seasons, the ambient noise monitoring included in this inventory was conducted during a relatively quiet period of time in the Unit. Additional noise monitoring is recommended to assess noise levels during heavy use periods when boating and traffic activities are highest.

### **Pre-test Boat Noise Measurement**

The pre-test noise measurement is used to clearly identify the (source) noise level of each individual boat/ski. To measure each individual source noise level, the noise level should be taken at a set distance, for example, at 25 feet or 50 feet, with minimal interference from other noise sources. This set of noise levels can be used to determine if ambient noise level observed at a specified location is from such noise source(s). The source noise level testing should be conducted for as many expected noise sources as possible, including jet skis, ski boats, and slower boats. The more completely the pre-test source noise levels are documented, the easier it will be at a later time to identify potential noise effect from a specific noise source.

### **Ambient Noise Measurement**

Ambient noise measurement around the Folsom Lake State Recreation Area should be conducted at the locations of concern near sensitive receptors such as residences or camp sites, based on CDPR staff recommendations. It is not expected that boating activities in the lake would occur over the nighttime period. Therefore, noise levels or standards in terms of the 24-hour weighted average, such as community noise equivalent level (CNEL) or day-night average noise level (Ldn) are not adequate for impact determination for boat noise. Noise measurements should be conducted for a 1-hour period at each monitoring site, recording the maximum noise level (Lmax), the percentile exceedance levels (Ln), and the continuous equivalent noise level (Leq). Observation of the correlation between the noise sources and the recorded noise levels should be documented to identify the potential sources of noise impacts at each monitoring site. This set of noise data can be used later to determine if mitigation measures, such as the restriction of certain types of activities in specified areas, will be required to meet applicable noise standards. CDPR staff will determine the number of noise monitoring sites.

### **Traffic Noise Measurement**

Traffic noise modeling is also recommended to be conducted after the traffic counts and projections in the Unit are available. Traffic noise levels on area roadway links will be tabulated for the baseline “no project” and the “with project” scenarios to determine the project’s contribution to the cumulative noise levels.

## **References**

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